working relations with the government authorities and as a result the small collections of fauna of that continent which we now possess will be greatly enriched. Captain Harold E. Anthony and George K. Cherrie, on an expedition to Ecuador, secured 4,000 specimens of birds and mammals. On this expedition the little-known country of the head hunting Jivaro Indians was penetrated, and valuable photographs secured. In Africa, Carl E. Akeley has been successful in obtaining a family of five gorillas. With the photographs and accessories which this well-known taxidermist, sculptor and hunter has secured, it will be possible to complete the finest group extant of these man-like apes. Entomological work has been carried on by Dr. F. E. Lutz in the Pine Barrens of New Jersey and Northeastern United States. Ethnological studies were made in Utah, New Mexico, California and Peru. By far the most important work in this field of science has been made possible through the funds provided by Mr. Archer M. Huntington for the completion of a restoration of the ruins at Aztec, New Mexico. Earl H. Morris, who has this work in charge, has forwarded highly important specimens found in these ruins and his observations will go far toward establishing the cultural area of the early inhabitants of our great southwest. Mr. Barnum Brown has sent important paleontological specimens from Egypt, Abyssinia and India, and Albert Thomson has continued, with success, work in the fossil fields of Nebraska. Through exchange and by gift, as a result of the Neolithic tour in Europe. Professor Henry Fairfield Osborn secured collections enriching our European archeology and established most agreeable working relations with eminent scientists of England, Norway, Sweden, Denmark, Belgium and France, to the end that new discoveries bearing on the antiquity of man in those countries will at once be forwarded to the American Museum.

At the beginning of the year the trustees recommended the grouping of the scientific work of the museum into four divisions in order to harmonize the work of the different departments, and in order to produce greater efficiency and economy for the future harmonious development of the exhibition halls of the museum. The following scheme of work is now in effect:

I. *Division of Mineralogy, Geology, Paleontology and Paleography:* Curator William Diller Matthew, F.R.S., in charge. Under leadership of Curator Matthew, Curators Whitlock, Hovey, Reed, Osborn, Granger and Brown will confer and cooperate in the development of their respective subjects and exhibition halls.

II. *Division of Zoology and Zoogeography:* Curator Frank Michler Chapman, N.A.S., in charge. This division will include mammals, birds, reptiles, amphibians, fishes, insects and marine and terrestrial invertebrates. Curators Andrews, Anthony, Gregory, Chapman, Murphy, Noble, Dean, Nichols, Gudger, Lutz and Miner will confer and cooperate in the development of their respective lines of exhibition and scientific work.

III. *Division of Anthropology:* Curator Clark Wissler, Ph.D., in charge. This division will be coordinate with the present Department of Anthropology but will include direction of the Galton Laboratory and progress of the Galton Society, also William K. Gregory as representative of comparative anatomy, J. Howard McGregor in human anatomy, Honorary Curator Osborn in geologic relations and prehistory of man.

IV. *Division of Education, Books, Publication and Printing:* Curator George H. Sherwood, M.A., in charge. This division will include the officers and chief of the Department of Public Education, of the library, of *Natural History*, of the printing and publication departments, and of public information.

Outstanding Publications: The publications of the American Museum of Natural History for the year have been the *Bulletins*, the *Memoirs*, the *Anthropological Papers*, the *Novitates*, *Natural History*, and the *Museum Journal*.

THE NECESSITY OF BALANCING DIETARIES WITH RESPECT TO VITAMINES

THE fairly recent discovery that small amounts of unknown substances are necessary constituents of a complete diet has opened up a large and evidently attractive field of research. The enthusiasm with which this work is being prosecuted and the novelty of many of the results obtained, have apparently led to the conviction in many quarters that vitamines are of great importance in practical

dietetics, and that human dietaries should be deliberately balanced with respect to these factors. It may be fairly questioned, however, whether this attitude is not premature. Investigators in this field should remember that their experiments are being performed upon animals chosen particularly because they are known to be readily susceptible to a deficiency of this or that vitamine. Pigeons are used for experimental investigation of the anti-neuritic vitamine, because they so readily succumb to a diet devoid of this factor, and because the symptoms induced are so characteristic of the dietary deficiency. Similarly with guinea pigs and monkeys and the anti-scorbutic vitamine, and with rats and the growth vitamines. It is of great significance that when other animals are used in these studies, the results obtained are often not clear cut. When guinea pigs, rabbits or monkeys are used in the study of vitamine A, or when rats are used in the study of vitamine C, inconstant or entirely negative results are observed.

It is of course permissible to use animals known to be highly sensitive to vitamine deficiencies in the study of the relative distribution of vitamines in food materials. Rats may be used, for example, in determining the relative concentration of vitamine A in cereal grains, tubers, green leaves, etc. From the results obtained it may be concluded that green leaves are much richer in the factor than are cereals, or, if the work is conducted on a quantitative basis, that certain green leaves are so many times richer than a certain cereal seed in the vitamine. This conclusion would evidently bear no relation to the species of animal used, but would have a general application to all animals. However, as is so often done, if it is concluded that oats or white corn or potatoes are *deficient* in vitamine A, the conclusion has no general applicability whatever. It should be rigidly restricted to the rat, which has been chosen because of its relatively great requirement for this vitamine. The statement that a food is *deficient* in a certain vitamine, defines a relation between the vitamine content of the food and the vitamine requirement of the experimental animal, and hence can not with any degree of certainty be applied to other animals.

In many of the original articles reporting the results of feeding experiments relative to the distribution of vitamines in food materials, this loose interpretation may be found. As a result certain foods are generally classed as being deficient in certain vitamines. We are told that the cereals and many of their milling products, white potatoes, white bread, meats, and animal fats are deficient in vitamine A, that white bread and milk are deficient in vitamine B, and that most dried and preserved foods are deficient in vitamine C, when the facts only warrant the statement that they are relatively poor in these vitamines. For all that is known to the contrary, the vitamine contents of these foods may be considerable in relation to human requirements, and hence in dietetics they can not be considered deficient in them in any strict sense of the word. To illustrate the point, meat seems to be distinctly deficient in vitamine C for the guinea pig, since very large amounts of meat or meat extract in the ration of guinea pigs will not adequately protect them against scurvy. On the other hand, for human beings, even the relatively low concentration of the vitamine in meats is still so considerable in relation to human requirements that a moderate consumption of fresh meats will prevent the outset of scurvy indefinitely. In human experience, therefore, fresh meats can not be considered deficient in vitamine C.

In the total lack of quantitative data on the vitamine requirements of humans, and in the very general absence of malnutrition or disease among people in this country which can with any degree of probability be diagnosed as involving vitamine deficiencies, it seems premature to formulate recommendations for the balancing of diets with respect to vitamines. The richness of milk and butter in vitamine A, for instance, has been made the basis for an extensive campaign in favor of substituting these products in the diet for foods not so rich in this factor. That this vitamine is ever a limiting factor in human dietaries is questionable, and any statement to that effect is not

based upon evidence, but upon uncertain analogy with laboratory animals. That human dietaries are so frequently deficient in the fat-soluble vitamine as to warrant general recommendations for an increased consumption of foods rich in this dietary factor, is a presumption still further removed from fact. The latter statement may also be made relative to any of the known vitamines.

In regard to vitamine A in particular, the fact is sometimes overlooked that this seems to be a peculiarly growth vitamine, its functions in the animal body probably being confined largely if not entirely to the period of active growth. Adult rats have been maintained in good health for over a year on rations devoid of this vitamine as judged by current standards. At the Illinois Agricultural Experiment Station, four sows have been maintained for nearly a year on a ration of white corn (Silver Mine) and tankage, and have successfully raised two litters of pigs each, though the ration, according to tests on rats, is nearly if not entirely devoid of vitamine A.

In a recent report on vitamines prepared by the Medical Research Committee of the (British) National Health Insurance Commission, the relation of vitamines to the public health is discussed somewhat fully, and the conclusions reached have been widely circulated in this country. The tenor of their conclusions is that "a deficiency in food, which when complete or extreme leads to actual disease, may, when only relative, be responsible for ill health of a vague but still important kind," and in particular that "a deficiency of an accessory factor (vitamine) may be of a much smaller order than that necessary to produce the typical syndrome of the disease usually associated with the deficiency, but may nevertheless be sufficient to induce a distinct failure of nutrition and health." No criticism can be made of such hypothetical statements as these, but when the argument is made to converge upon a definite proposition that "there is a very real danger that the improperly balanced dietaries consumed in many cases may lead to a partial deficiency of one or more of the necessary substances (vitamines), if not of other components as well," one may be pardoned for questioning the reality of any such danger. The reasons for transforming a possibility into a "very real danger" are not at all obvious. And yet such a transformation is tacitly involved in any general recommendation that vitamine foods should be substituted in the bill of fare for other food materials less rich in vitamines, or that vitamine preparations having little other food value should be regularly consumed.

In the issue of SCIENCE for October 28, McClendon argues for the use of tablets containing vitamines A, B, and C. His plea is based upon premises of doubtful soundness. He points out the low content in vitamines of wheat flour, cane sugar, and hydrogenated fats, but does not consider the possibility that other staple articles of food, available the year round, including dairy products, meats, potatoes, and canned and preserved vegetables and fruits, may entirely supplement the diet with respect to vitamines. Nor does he consider that the general consumption of fresh vegetable foods, rich in vitamines, during the spring and summer months may result in a considerable storage of vitamines in the body which may aid in tiding over a period of low vitamine intake. The statement made that "there are many families who do not, under the present system, receive sufficient vitamines in their food," has no claim to credence, since it does not seem to be based upon any evidence whatsoever. Nor is there any particular reason why it should be assigned any high degree of probability.

The attitude taken in this brief discussion of the practical bearing of the recently acquired fund of information relating to vitamines, is admittedly conservative, though only to the extent of insisting that the connection between general conclusions and recommendations on this matter and experimental or other evidence should be sufficiently tangible to constitute at least a fair deduction. At a time when popular periodicals are widely publishing irresponsible articles on vitamines, ignorantly or deliberately creating an entirely distorted popular conception of them, and when commercial concerns are widely advertising purely hypothetical ad-

vantages of vitamine preparations, it is particularly important that investigators in nutrition exert great care in the wording of statements as to the practical significance of vitamines in every day life. Otherwise they may become unwilling accomplices in the perpetration of a gigantic fraud upon the American public.

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ANSEL AUGUSTUS TYLER

THE sudden death of Professor Tyler of Millikin University (Decatur) on March 31 from pneumonia has taken from the institution and the college circle of the state a quiet and faithful worker whose place will be hard to fill.

Ansel Augustus Tyler was born at East Bridgewater, Pa., on March 7, 1869. He received his A.B. at Lafayette College in 1892, and won the Ph.D. at Columbia University in 1897. Thereafter he taught botany or biology for a year each at Union College, Syracuse and Arizona, with such success that in 1900 he was called to take charge of this work at Bellevue College in Omaha. At that date the prospects before Bellevue were alluring and he threw himself wholeheartedly into the work of building up not only his own department but also the college itself. The high appreciation in which his efforts were held was manifested by his election as dean of the college in 1911, a position which he held as long as he remained there. But the fortunes of Bellevue suffered serious reverses and, although Tyler devoted himself unsparingly to its service, he found the institution steadily losing ground through influences which he could not control or modify. So in 1916 he accepted a call to take charge of the department of biology at Millikin University. Here again he was formed to carry a heavy load of teaching during a transition period, but a year ago was granted some much needed aid in his department and had just started to realize his cherished ambition of developing that work when his career was so prematurely terminated.

Tyler's ability as a college student won him the Latin salutation on graduation and also election to Phi Beta Kappa. His later work brought him in 1898 membership in Sigma Xi. He was a fellow of the American Association and a working member of the State Academies in Nebraska and Illinois. In 1908 he was honored by election as president of the Nebraska Academy. Although quiet and retiring in personality, he was always ready to carry his part in enterprises of public merit. Thus in 1910 there was organized a movement to secure and preserve for Omaha a splendid and unique tract of wild forest near that city. Tyler served as secretary of this organization, the Fontanelle Forest Association, until he left Bellevue, and did much to develop public sentiment in favor of the project, which has recently realized much of its hopes through a generous gift from a public spirited citizen of Omaha.

But Dr. Tyler's greatest work was after all in his department. He inspired many college generations with his own high ideals of service and love of the truth. From his class room went out a steady stream of students filled with love of science and steadied by his calm and thoughtful leadership to test the offerings of life, to reject the hollow and false, and to cherish the true. Such service to the college and the state can not be measured in formal terms but will always be held in grateful remembrance by his students and his colleagues, as well as by the many other friends to whom he devoted himself equally unselfishly.

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SCIENTIFIC EVENTS

RESEARCH WORK IN COAL MINING

THROUGH the efforts of the coal operators of western Pennsylvania, another year of extensive research work in coal mining will be conducted by the cooperative department of mining engineering of Carnegie Institute of Technology and the Pittsburgh Experimental Station of the United States Bureau of Mines. The research will be carried on through teaching and research fellowships appointed by the Carnegie Institute of Technology and supervised by senior investigators in the Experimental Station.